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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/684,088	10/12/2003	Martin M. Liphardt		3036

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EXAMINER	
AKANBI, ISIAKA O	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 12/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/684,088	LIPHARDT ET AL.	
	Examiner	Art Unit	
	Isiaka O. Akanbi	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12 October 2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement file October 12th, 2003 has been entered and reference considered by the examiner.

Drawings

The examiner approves the drawings filed October 12th, 2003.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 19 and 20 are rejected as failing to define the invention in the manner required by 35 U.S.C. 112, second paragraph.

The claim is narrative in form and replete with indefinite and functional or operational language, for example the phrase "the purpose being to align said sample surface to assure that said beam of electromagnetic radiation provided to said monitored location on the surface of said sample at an oblique angle approaches said surface at known intended angle of incidence and plane of incidence orientation, rather than at an angle of incidence and plane of incidence orientation which is modified by surface irregularities or non-flat samples". The structure which goes to make up the device must be clearly and positively specified. The structure must be organized and correlated in such a manner as to present a complete operative device. The examiner suggests that appropriate correction is required for the purpose of clarity.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6-9 and 13-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Xu et al. (6,590,656). The reference of Xu discloses the features of the claimed as follows:

As regard to claim 1, Xu discloses a system for aligning a sample comprising of the following:

a pivot mounted stage/sample (14)(fig. 1A);

a means (14) for imparting translation motion to said pivot mounted stage/sample substantially along a perpendicular to a surface thereof (Page 3, Par. 0036, line 5-6)(fig.1);

a first source (22) of a first beam of electromagnetic radiation in functional combination with a multi-element alignment detector comprised of at least two detector (34/60) (fig. 1A) elements surrounding a hole there through; and

a second source of a second beam (30) (fig. 1A) of electromagnetic radiation; and a data detector (40);

said first source (22) of a first beam of electromagnetic radiation being oriented so as to provide a first beam of electromagnetic radiation through said hole in said multi-element alignment detector (fig. 1A);

said pivot mounted stage/sample (14) being positioned to receive said first beam of electromagnetic radiation substantially along a normal to a surface of said pivot mounted stage/sample via said hole said multi-element alignment detector (Page 3, Par. 0036, line 1-9)(fig.1);

said second source of electromagnetic radiation being positioned to provide a beam (30) of electromagnetic radiation and direct it to the surface of said sample at an oblique angle thereto (fig. 1A), such that said second beam of electromagnetic radiation reflects from said surface of said pivot mounted stage/sample (12c)(fig. 1A) (Page 3, Par. 0036, line 1-9);

said first and second electromagnetic beams being oriented with respect to one another at a known angle (fig. 1A) (Page 3, Par. 0036, line 6-9);

said pivot mounted stage/sample (14) being mounted to said means for imparting translation motion such that said pivot mounted stage/sample can be caused to move substantially along a perpendicular to the surface thereof, such that the reflected second beam (30) of electromagnetic radiation enters said data detector (40))(fig. 1A) (Page 3, Par. 0036, line 2-9)

As to claim 2 and 7, Xu discloses a method of aligning a sample comprising the steps of:

a) providing a pivot mounted stage/sample (14)(fig. 1A); and a means for imparting translation motion to said pivot mounted stage/sample substantially along a perpendicular to a surface thereof (Page 3, Par. 0036, line 5-6)(fig.1);

a first source (22) of a first beam of electromagnetic radiation in functional combination with a multi-element alignment Detector comprised of at least two detector (34/60) elements surrounding a hole therethrough (fig. 1A); and a second source of a second beam (30) of electromagnetic radiation; and a data detector (40);

said first source (22) of a first beam of electromagnetic radiation being oriented so as to provide a first beam of electromagnetic radiation through a hole in said multi-element alignment detector (Page 3, Par. 0036, line 28-30)(fig.1);;

said pivot mounted stage/sample first beam of electromagnetic being positioned to receive said radiation substantially along a normal to a surface (12c) of said pivot mounted stage/sample via said hole in said multi-element alignment detector (see fig. 1A);

said second source of a second beam (30) of electromagnetic radiation being oriented such that a beam of electromagnetic is provided thereby at an oblique angle to the surface (12c) of said sample (fig. 1A);

said first and second electromagnetic beams being oriented with respect to one another at a known angle (see fig. 1A);

b) causing a first beam of electromagnetic radiation from said first source of a first beam of electromagnetic to pass through said hole in the multi-element alignment detector such that said first beam of electromagnetic radiation reflects from the surface of said pivot mounted stage/sample (Page 4, Par. 0039, line 11-13)(fig.1);

c) pivoting said sample about said stage/sample (14) pivot mounting until signals from all of the detector detector elements in the multi-element alignment detector are substantially minimized or equalized, indicating that said first beam of electromagnetic radiation approaches said surface of said sample substantially along a normal thereto (fig. 1A)(Page 3, Par. 0039, line 13-17);

d) causing said second source of electromagnetic radiation to provide a beam (30) of electromagnetic radiation and direct it to the surface (12c) of said sample at an oblique angle thereto, such that said second beam of electromagnetic radiation reflects from said surface of said pivot mounted stage/sample (fig.1);

e) optionally causing said pivot mounted stage/sample to undergo translation motion substantially perpendicular (z axis, see fig. 1A) to the surface of said sample via said means for imparting translation motion to said pivot mounted stage/sample (Page 3, Par. 0036, line 5-6)(fig.1); such that the reflected second beam of electromagnetic radiation is directed to enter said data detector (40).

As to claims 3 and 8, Xu discloses wherein the steps c. and e. are automated (Page 4, Par. 0040).

As to claims 4, 9, 16, 17 and 18, Xu discloses a method of aligning a sample which comprises repeating the method at another/different location on the sample (fig. 1B)(Page 3, Par. 0036, line 6-9).

Regarding claim 6, Xu discloses a system for aligning a sample comprising:

a pivot mounted stage/sample (14);

a means (14) for imparting translation motion to said pivot mounted stage/sample substantially along a perpendicular to a surface (12c) thereof (fig. 1A) (Page 3, Par. 0036, line 5-6);

a first source (22) of a first beam of electromagnetic radiation in functional combination with a beam splitter (52/62) and a multi-element alignment detector comprised of at least two detector (34/60) elements (fig. 1A); and a second source of a second beam (30) of electromagnetic radiation; and a data detector (40);

said first source (22) of a first beam of electromagnetic radiation being oriented so as to transmit a first beam of electromagnetic radiation through said beam splitter (52)(fig. 1A);

said pivot mounted stage/sample (14) being positioned to receive said first beam of electromagnetic radiation substantially along a normal to a surface of said pivot mounted stage/sample via said beam splitter (52/62)(fig. 1A);

said multi-element alignment detector being positioned to receive electromagnetic radiation reflected from said surface (12c) of said sample which is reflected from said beam splitter (52/62)(fig.1A);

said second source of electromagnetic radiation being positioned to provide a beam (30) of electromagnetic radiation and direct it to the surface (12c) of said sample at an oblique angle thereto, such that said second beam (30) of electromagnetic radiation reflects from said surface of said pivot mounted stage/sample (fig. 1A);

said first and second electromagnetic beams being oriented with respect to one another at a known angle (see fig. 1A);

said pivot mounted stage/sample (14) being mounted to said means (14) for imparting translation motion such that said pivot mounted stage/sample can be caused to move substantially along a perpendicular (z axis) to the surface thereof, such that the reflected second beam (30) of electromagnetic radiation enters said data detector (40))(fig. 1A) (Page 3, Par. 0036, line 2-9).

As to claim 13, 14 and 15, Xu discloses wherein a method of aligning a sample in which the first and second beams of electromagnetic radiation from the first and second sources of electromagnetic radiation to both impinge on the sample surface at substantially the same spot (see fig. 1A).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5, 10, 11, 12, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over of Xu et al. (6,590,656) in view of Rosencwaig et al. (6,297,880 B1).

Claims 5, 10, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over of Xu et al. (6,590,656) in view of Rosencwaig et al. (6,297,880 B1), as applied to claims 2, 7, 1 and 6. The reference of Xu discloses of the features of claims 5, 10, 11 and 12, comprising multi-element alignment detector, however the reference of Xu is silent regarding the type of detector as being a quad detector comprising four detector elements. The reference of Rosencwaig teaches of quad detector with four radially disposed quadrants (col. 5, line 20-25). It would have been obvious to one having ordinary skill in the art at the time of invention to use quad detector for the purpose of monitoring periodically the changes in the position of the reflected probe beam.

Regarding claims 19 and 20, the system of Xu discloses a system for aligning a sample system and controlling the angle and plane of incidence at which a beam of electromagnetic radiation obliquely impinges on a monitored location of a surface (12c) of a sample comprising, as viewed in side elevation:

a sample supporting stage (14) which can be translated in "X" "Y" or "Z" directions as well as rotated about "X", "Y" and optionally "Z" axes (fig. 1A)(Page 3, Par. 0036, line 1-9);

vertically above said stage there being a first beam splitter means (52/62), a lens (54) and a first camera means (60) for providing a view of a portion of the surface of said sample (12b), said first beam splitter means optionally having positioned on a lower surface thereof light emitting means for providing light to the surface (12c) of said sample (12b)(fig. 1A);

laterally with respect to said first beam splitter means (52/62) there being a reflection means (54);

vertically above said reflection means there being a second beam splitter (52);

said system further comprising an ellipsometer polarization state generator (28) to cause, and a polarization stage detector (32) to monitor, a beam of electromagnetic radiation (30) which in use impinges on said monitored location on said surface (12c) of said sample at an oblique angle thereto(fig. 1A);

such that in use said first camera means and its associated display means provide a view of at least a portion of the surface (12c)(fig. 1A and 1B) of a sample (14) utilizing light provided by said light emitting means (22) for providing light to the surface of said sample positioned on said lower surface of said first beam splitter (62), and said essentially point source

of electromagnetic radiation provides electromagnetic radiation to the surface of said sample via said second beam splitter (52), said reflective means (54) and said first beam splitter (52);

and said sample supporting stage is caused to be translated in any of said "X" "Y" and "Z" directions (Page 3, Par. 0036, line 1-9) as well as rotated about said "X", "Y" and optionally "Z" axes (Page 1, Par. 0009, line 3-5) which are necessary to cause an interrogating beam of electromagnetic radiation provided by said essentially point source of electromagnetic radiation to reflect from the surface of said sample (12b), proceed back through said first beam splitter means (64), reflect from said reflective means (54), pass through said second beam splitter means (52);

with regard to the following phrase "the purpose being to align said sample surface to assure that said beam of electromagnetic radiation provided to said monitored location on the surface of said sample at an oblique angle approaches said surface at known intended angle of incidence and plane of incidence orientation, rather than at an angle of incidence and plane of incidence orientation which is modified by surface irregularities or non-flat samples" it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

Further Xu discloses said system being functionally characterized by a first source (22) of a first beam of electromagnetic radiation in functional combination with a multi-element alignment detector comprised of at least two detector (34/60) elements surrounding a hole therethrough, said first source (22) of a first beam of electromagnetic radiation being oriented so as to provide a first beam of electromagnetic radiation through said hole in said multi-element alignment detector such that when said first beam of electromagnetic radiation is directed substantially along a normal to a surface of said sample (12b) surface (12c) via said hole in said multi-element alignment detector, substantially equal amounts of electromagnetic radiation enter each of the detector elements of said multi-element alignment detector (fig. 1A); said first beam of electromagnetic radiation being oriented at a known angle with respect to said beam of electromagnetic radiation provided to said monitored location on the surface of said sample at an oblique angle (fig. 1A).

The reference of Xu is silent regarding the type of detectors use as being cameras and that vertically above said second beam splitter there being a second camera means and laterally with respect to said second beam splitter there being sequentially a lens. Rosencwaig

teaches of the use cameras (66/86) and lens (32/38/50)(fig. 1). Therefore it would have been obvious to one having ordinary skill in the art at the time of invention to position and use camera means and lens for the purpose of extracting information about reflected rays at specific angles of incidence and used the lens to image the full beam onto the surface of the detector/camera.

Additional Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The references listed in the attached form PTO-892 teach of other prior art alignment devices that may anticipate or obviate the claims of the applicant's invention.

Conclusion

Fax/Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Isiaka Akanbi whose telephone number is (571) 272-8658. The examiner can normally be reached on 8:00 a.m. - 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Isiaka Akanbi
November 29, 2005

Gregory J. Toatley, Jr.
Supervisory Patent Examiner
2Dec05